Amendments to Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A transceiver for driving and receiving a signal through a transformer comprising:

an FET power transistor having an output contact for conducting current to a coil of a transformer, said power transistor having a control gate with a parasitic capacitance;

a gate drive circuit which provides a controlled current flow to and from the gate so as to charge and discharge the gate and its parasitic capacitance, and so as to increase and decrease, respectively, the output current supplied by the output of the power transistor at a controlled rate;

wherein said drive circuit controls said current flow by causing a voltage level that drives such current to compensate for changes in the voltage on the gate so as to make the rate at which such current flows substantially constant~~more even~~ during said charging and discharging.

2. (original) A transceiver as in Claim 1 wherein:

there are two of said power transistors, each with an associated output contact, including a first such transistor for driving current across said transformer in a first direction during one part of an output signal cycle, and a second such transistor for driving current across said transformer with a second, opposite, direction during another part of said output signal cycle; and

each of said first and second power transistors has a corresponding one of said gate drive circuits for charging and discharging its control gate.

3. (original) A transceiver as in Claim 2 wherein:

each of said first and second power transistors is one transistor of a first and second complimentary pair of power transistors, respectively; and

each complimentary pair includes two power transistors connected in series across a power supply with an associated one of said output contacts connected between them.

4. (original) A transceiver as in Claim 2 wherein each of said gate drive circuits uses a substantially constant current source to charge its associated control gate during at least a portion of the charging of that gate.

5. (original) A transceiver as in Claim 2 further including:

a receiver input circuit having:

a pair of input connections for connection to each side of said transformer coil and for receiving the voltage differential across that coil; and

circuitry for providing an output measurement signal which varies as a function of said received voltage differential; and

a feedback circuit for controlling when to stop said current flow to said control gate of one of said power transistors driving current across said transformer when said output measurement signal indicates said received voltage differential has reached a desired level.

6. (currently amended) An output circuit for driving a signal comprising:

an FET power transistor having an output contact, said power transistor having a control gate with a parasitic capacitance;

a gate drive circuit that provides a controlled current flow to and from the gate to charge and discharge the gate and its parasitic capacitance, so as to increase and decrease, respectively, the output signal supplied by the output of the power transistor at a controlled rate, said drive circuit controlling said current flow by causing a voltage level that drives such current to compensate for changes in the voltage on the gate so as to make the rate at which such current flows <u>substantially constant</u> ~~more even~~ during said charging and discharging; and

feedback circuitry that senses said output signal and substantially stops current flow to or from said control gate when it senses that said output signal has reached a desired level.

7. (original) An output circuit as in Claim 6 for use in driving said signal on two output contacts, so a differently phased version of the signal is supplied to each such contact, wherein:

there are at least two of said power transistors, a first for driving current corresponding to said signal from its output contact in a first phase and a second power transistor for driving current corresponding to said signal from its output contact in a second phase; and

each of said first and second power transistors has a corresponding one of said gate drive circuits for charging and discharging its control gate at a controlled rate.

8. (original) An output circuit as in Claim 7 wherein said feedback circuitry senses a voltage difference between the two differently phased outputs and substantially stops the flow of current to or from the control gate on one or more of said two power transistors when it senses that said voltage difference has reached a desired level.

9. (original) An output circuit as in Claim 7 wherein each of said gate drive circuits uses a substantially constant current source to charge its associated control gate during at least a majority of the time spent charging that gate.

10. (canceled)

11. (currently amended) A transceiver as in Claim 12~~0~~ wherein at least a part of said transceiver is constructed as a single monolithic circuit including:

said input connections;

at least part of said receiver circuitry;

at least part of said transmitter circuitry; and

said first and second pair of output connections.

12. (currently amended) A transceiver for driving and receiving a signal through a transformer comprising: ~~as in Claim 10~~

a pair of input connections for receiving an input signal from a transformer coil; receiver circuitry for amplifying said input signal and producing an amplified input signal;

transmitter circuitry including one or more output transistors for driving an output signal;

pairs of output connections from which said output signal can be connected across said transformer coil, including a first pair for driving a center tapped transformer and a second pair for driving a bridge transformer;

~~further including~~ a center tapped transformer; and

feedback circuitry for using a comparison between said amplified input signal and a desired signal level to control the amplitude of said output signal generated by said transmitter circuitry;

wherein:

said first pair of output connections are connected across a center tapped transformer to drive said output signal across that transformer; and

said pair of input connections are connected across said center tapped transformer to receive the differential voltage across that transformer as said input signal~~; and~~

~~further including feedback circuitry for using a comparison between said amplified input signal and a desired signal level to control the amplitude of said output signal generated by said transmitter circuitry~~.

13. (currently amended) A transceiver as in Claim 12 wherein:

each of said first pair of output connections has isolation circuitry for electrically isolating it from the transmitter circuitry when the voltage on said first pair of output connections goes below ground~~during a different portion of the output signal~~; and

the output connections of said second pair of output connections do not have such isolation circuitry.

14. (original) A transceiver as in Claim 13 wherein the transceiver's circuitry is designed to only operate on a single polarity power supply.

15. (original) A transceiver as in Claim 12 wherein:

said transceiver is powered by a power supply having a given power supply voltage range;

said receiver circuitry includes for each of said input connections an associated resistor and input operational amplifier;

each such input connection is connected through its associated resistor to a virtual ground at one input to its associated input amplifier; and

the virtual ground at one input of each input amplifier is maintained through feedback current from the amplifier's output that causes a variable voltage drop through the associated resistor as the voltage on the amplifier's associated input connection varies, so that even if a voltage received at an input connections ranges outside the power supply voltage range, the voltage at the virtual ground input into the associated input amplifier will remain substantially constant, and, thus, within the power supply voltage range.

16. (original) A transceiver as in Claim 15:

wherein said receiver circuitry includes circuitry for using said input amplifier feedback currents to generate an amplified input signal which varies as a function of the differential voltage across the transformer to which the input connections are connected; and

further including an output control feedback loop for responding to the difference between said amplified input signal and a desired signal level to control the amplitude of said output signal.

17-18. (canceled)

19. (currently amended) A transceiver ~~as in claim 18~~ for driving and receiving a signal through a transformer, comprising: ~~further including~~

a pair of input connections for receiving an input signal from a transformer coil;

receiver circuitry for amplifying that input signal and producing an amplified input signal;

transmitter circuitry including one or more output transistors for driving an output signal;

pairs of output connections for connecting said output signal across said transformer coil, including a first pair for driving a center tapped transformer and a second pair for driving a bridge transformer;

feedback circuitry for using a comparison between said amplified input signal and a desired signal level to control the amplitude of said output signal; and

a center tapped transformer;

wherein:

each output connection of said first pair of output connections has isolation circuitry for electrically isolating said output connections from said transmitter circuitry when the voltage on such a connection goes below ground;

said second pair of output connections do not have such isolation circuitry;

said first pair of output connections are connected across the center tapped transformer to drive said output signal across that transformer; and

said pair of input connections are connected across said center tapped transformer to receive the differential voltage across that transformer as said input signal.

20. (canceled)

21. (currently amended) A transceiver for both driving and receiving signals through a center tapped transformer including the transmitter, comprising ~~of Claim 20,~~:

a pair of input connections for connection across the center tapped winding so as to receive the differential voltage across said winding;

transmitter circuitry including one or more output transistors for driving an output signal;

a pair of output connections from which said output signal is connected across the center tapped winding of said transformer, where each output connection of said pair has isolation circuitry for electrically isolating said output connection from the transmitter circuitry during a different portion of the output signal;

feedback circuitry for using a comparison between said received differential voltage and a desired signal level to control the amplitude of said output signal; and

~~wherein said transceiver includes~~ receiver circuitry connected to said pair of input connections for producing an amplified input signal which varies as a function of said received differential voltage.

22. (currently amended) A transmitter for driving an output signal through a transformer having a center tapped winding, said transmitter comprising: ~~as in Claim 20~~

a pair of input connections for connection across the center tapped winding so as to receive the differential voltage across said winding;

transmitter circuitry including one or more output transistors for driving an output signal;

a pair of output connections from which said output signal can be connected across the center tapped winding of said transformer, where each output connection of said pair has isolation circuitry for electrically isolating it from the transmitter circuitry during a different portion of the output signal; and

feedback circuitry for using a comparison between said received differential voltage and a desired signal level to control the amplitude of said output signal;

wherein:

said one or more output transistors are FET transistors each having an output contact and a control gate with a parasitic capacitance;

said transmitter circuitry includes a gate drive circuit that provides a controlled current flow to and from the gate of each output transistor to charge and discharge that gate and its parasitic capacitance, so as to increase and decrease, respectively, the output signal supplied by the output contact of the output transistor, said drive circuit controlling said current flow by causing the voltage level that drives such current to compensate for changes in the voltage on the gate so as to make the rate at which such current flows more even during said charging and discharging; and

said feedback circuitry substantially stops the flow of said current to or from said control gate as a function of said comparison between said received differential voltage and the desired signal level.

23. (allowed) A receiver for receiving a signal generated across a winding of a transformer, said receiver comprising:

a pair of input connections for receiving a differential voltage input from opposite sides of said transformer winding;

a separate operational amplifier associated with each of said two input connections including:

two inputs, a first of which is connected to a reference voltage;

at least one output connected to the second of said amplifier's inputs to form an operational amplifier feedback loop which holds that second input at a virtual ground;

a separate resistor associated with each of said two input connections, connected between said input connection and the virtual ground at the second input of the input connection's associated amplifier, so that current in the operational amplifier feedback loop can flow through said resistor to the associated input connection to help hold the amplifier's virtual ground at its associated reference voltage;

wherein said receiver is designed to be powered by a power supply providing electrical power having a certain power supply voltage range; and

whereby even if a voltage received at an input connections ranges outside the power supply voltage range, the voltage at the virtual ground input into the associated input amplifier will remain substantially constant, and, thus, within the power supply voltage range.

24. (currently amended) A transceiver including the receiver of Claim 23 further including:

transmitter circuitry including one or more output transistors for driving an output signal;

a pair of output connections for driving a center tapped transformer, with each connection of said pair having isolation circuitry for electrically isolating said connection ~~it~~ from such transmitter circuitry during different polarities of the output signal;

circuitry for producing an output measurement signal as a function of the feedback currents in said two input amplifiers, which signal varies as a function of the differential voltage supplied between the input connections; and

feedback circuitry for using a comparison between said output measurement signal and a desired signal level to control the amplitude of said output signal.

25. (original) A transceiver as in Claim 24 wherein:

the transceiver is designed for a power supply voltage range between ground and a given power voltage; and

said transceiver is designed so that when said output connections and input connections are connected to opposite ends of a center tapped transformer and said transmitter circuitry drives said output signal, the voltages received at said input connections range on the opposite side of ground from said given power voltage.

26. (original) A receiver as in Claim 23:

wherein:

the input amplifier connected to a first of the input connections produces a first feedback current which is a function of the voltage of the first input connection; and

the input amplifier connected to a second of the input connections produces a second feedback current which is a function of the first feedback current minus a feedback current generated by said input amplifier which is proportional to the voltage of the second input connection; and

further including circuitry for producing an amplified input signal as a function of the second feedback signal.

27. (original) A receiver as in Claim 23 wherein each input amplifier has two outputs, with circuitry causing substantially equal current to flow in each output even if the loads on those outputs differ, with one of the outputs connected to provided the feedback current necessary to maintain the virtual ground at the amplifier's second input, and the other output producing an equal current used for another purpose.

28. (canceled)

29. An operational amplifier as in Claim 30~~28~~ wherein said circuitry for causing substantially equal current to flow in each of said two outputs includes similar circuitry to drive each such output, including similar transistors connected to similar control voltages.

30. (currently amended) An operational amplifier, comprising: ~~as in Claim 28~~

two inputs;

two outputs; and

circuitry for causing substantially equal current to flow in each of said two outputs even if the loads on them vary;

wherein said circuitry for causing substantially equal current to flow in each of said two outputs includes a separate complementary pair of output transistors driving each such output, ~~which~~ each output transistor of each such pair having a corresponding

cascode transistor to cause each output transistor's ~~its~~ current to be less affected by variations in the voltage of each such complementary pair's output.

31. (canceled)

32. (currently amended) A transmitter for driving an output signal through a transformer, comprising: ~~as in Claim 31~~

transmitter circuitry including one or more output transistors for driving said output signal;

a pair of output connections from which said output signal is connected across said transformer coil;

circuitry for producing a measurement of current flow across one or more of said output transistors; and

circuitry for substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein:

said transmitter is powered by a power supply having two voltage rails;

there are at least two complimentary pairs of said power transistors, each having two output transistors connected in series between said voltage rails with a node between them to which the pair's associated output connection is connected;

the transmitter circuitry includes circuitry for driving said two complementary pairs, so that one pair can drive current in a first direction across said transformer during one part of an output signal cycle, and the other pair can drive current in an opposite direction across said transformer during another part of the output signal cycle;

each output transistor in each complementary pair has associated circuitry for producing said measurement of current flow across it; and

said circuitry for substantially turning off current flow in said one or more output transistors substantially turns off current flow in all of said output

transistors in response to a measurement that current flow in any one of said output transistors exceeds a given level.

33. (currently amended) A transmitter as in Claim 32~~1~~ wherein at least a part of said transmitter is constructed as a single monolithic circuit including:

said output transistors;

at least part of said circuitry for measuring; and

at least part said circuitry for substantially turning off are all on one semiconductor chip.

34. (currently amended) A transmitter for driving an output signal through a transformer comprising: ~~as in Claim 33 wherein said monolithic circuit further includes:~~

transmitter circuitry including one or more output transistors for driving said output signal;

a pair of output connections from which said output signal is connected across said transformer coil;

circuitry for producing a measurement of current flow across one or more of said output transistors; and

circuitry for substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein at least a part of said transmitter is constructed as a single monolithic circuit including:

said output transistors;

at least part of said circuitry for measuring;

at least part said circuitry for substantially turning off are all on one semiconductor chip;

external connections for providing transistor drive signals to one or more external power transistors which can be used for driving an output signal across a transformer;

an external current overflow connection for receiving an indication of a current overflow in one or more of said external power transistors; and

circuitry for responding to such an indication of an external overflow by substantially turning off said transistor drive signals.

35. (currently amended) A transceiver including the transmitter of Claim 32~~1~~, said transceiver further including:

a pair of input connections for receiving an input signal from a transformer coil; and

receiver circuitry for amplifying that input signal and producing an amplified input signal.

36. (currently amended) A transmitter for driving an output signal through a transformer comprising: ~~as in Claim 31~~

transmitter circuitry including one or more output transistors for driving said output signal;

a pair of output connections from which said output signal is connected across said transformer coil;

circuitry for producing a measurement of current flow across one or more of said output transistors; and

circuitry for substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein:

said transmitter generates said output signal in response to a digital sequence of one or more successive output bits received from other circuitry;

said circuitry for substantially turning off current includes latching circuitry for keeping the current turned off, once it has been turned off, until the next end of a sequence of successive output bits is received from said other circuitry; and

said latching circuitry is reset after said next end of said sequence of successive output bits, so that a later sequence of successive output bits received from said other circuitry can cause said transmitter to generate another output signal.

37. (currently amended) A transmitter as in Claim 32~~1~~ wherein said circuitry for producing a measurement includes a current sensing resistor in series with the current flowing through one or more output transistors.

38. (canceled)

39. (currently amended) A method of operating a transceiver for driving and receiving a signal through a transformer which has an FET power transistor having an output contact for conducting current to a coil of a transformer and a control gate with a parasitic capacitance, said method comprising: ~~as in Claim 38~~

connecting the output contact to one end of the transformer; and

providing a controlled current flow to and from the gate so as to charge and discharge the gate and its parasitic capacitance, and so as to increase and decrease, respectively, the output current supplied by the output of the power transistor at a controlled rate;

wherein said current flow is controlled by causing a voltage level that drives such current to compensate for changes in the voltage on the gate so as to make the rate at which such current flows substantially constant during said charging and discharging;

wherein:

there are two of said power transistors, each with an associated output contact, including a first such transistor for driving current across said transformer in a first direction during one part of an output signal cycle, and a second such transistor for driving current across said transformer with a second, opposite, direction during another part of said output signal cycle; ~~and~~

the output contact of one such power transistor is connected to one end of the transformer and the output contact of the other power transistor is connected to another end of the transformer; <u>and</u>

said controlled current flow is provided to and from the gate of each of said first and second power transistors at different times so as to cause said transistors to drive said current across said transformer in said different directions.

40. (original) A method as in Claim 39 wherein:

each of said first and second power transistors is one transistor of a first and second complimentary pair of power transistors, respectively;

each complimentary pair includes two of said power transistors connected in series across a power supply with an associated one of said output contacts connected between them; and

said limited current flow is provided to the gate of each of said four power transistors.

41. (original) A method as in Claim 39 wherein a substantially constant current source is used to charge each of said control gates during at least a portion of the charging of that gate.

42. (original) A method as in Claim 39 wherein:

said transceiver has a receiver input circuit;

a pair of input connections from the receiver input circuit are connected to each side of said transformer coil for receiving a voltage differential across that coil; and

the receiver input circuitry provides an output measurement signal which varies as a function of said received voltage differential; and

a feedback circuit controls when to stop said current flow to said control gate of one of said power transistors driving current across said transformer when said output measurement signal indicates said received voltage differential has reached a desired level.

43. (allowed) A method of operating an output circuit for driving a signal with an FET power transistor having an output contact and control gate with a parasitic capacitance, said method comprising:

providing a limited current flow to and from the gate to charge and discharge the gate and its parasitic capacitance, so as to increase and decrease, respectively, the output signal supplied by the output of the power transistor at a controlled rate;

sensing said output signal; and

stopping current flow to or from said control gate when said sensing senses that said output signal has reached a desired level.

44. (currently amended) A method as in Claim 43 for driving said signal on two output contacts, so a differently phased version of the signal is supplied to each such contact, wherein:

there are at least two of said power transistors;

a first of said power transistors drives current corresponding to said signal from the ~~its~~ output contact of said first power transistor in a first phase;

a second of said power transistors drives current corresponding to said signal from the ~~its~~ output contact of said second power transistor in a second phase;

said controlled current flow is provided to and from the control gate of each said two power transistors; and

the current flow to or from each such control gate is stopped in response to the sensing of said output signal.

45. (original) A method as in Claim 44 wherein said sensing senses a voltage difference between the two outputs of the differential signal and stops current flow to or from the control gate on one or more of said two power transistors when it senses that said voltage difference has reached a desired level.

46. (original) A method as in Claim 44 wherein a substantially constant current source is used to charge each of said control gates during at least a majority of the time spent charging that gate.

47. (currently amended) A method of operating a transceiver for driving and receiving a signal through a transformer, where said transceiver includes:

a pair of input connections for receiving an input signal from a transformer coil;

receiver circuitry for amplifying that input signal and producing an amplified input signal;

transmitter circuitry including one or more output transistors for driving an output signal; and

pairs of output connections from which said output signal can be connected across said transformer coil, including a first pair for driving a center tapped transformer and a second pair for driving a bridge transformer;

said method comprising:

connecting said pair of input connections across a given transformer which is either a center t~~r~~apped transformer or bridge transformer; and

selecting to connect said first pair of output connections across said given transformer if it is a center tapped transformer and to connect said second pair of output connections across said transformer if it is a bridge transformer.

48. (original) A method as in Claim 47 wherein at least a part of said transceiver is constructed as a single monolithic circuit including:

said input connections;

at least part of said receiver circuitry;

at least part of said transmitter circuitry; and

said first and second pair of output connections.

49. (currently amended) A method as in Claim 48 further including the steps of:

electrically isolating each of said first pair of output connections from the transmitter circuitry during a different portion of the output signal; and

not electrically isolating either of said second pair of output connections during any portion of the output signal.

50. (original) A method as in Claim 49 wherein the transceiver's circuitry operates on a single polarity power supply.

51. (original) A method as in Claim 48 wherein:

said transceiver is powered by a power supply having a given power supply voltage range;

said receiver circuitry includes for each of said input connections an associated resistor and input operational amplifier;

each such input connection connects through its associated resistor to a virtual ground at one input to its associated input amplifier; and

the virtual ground at one input of each input amplifier is maintained through feedback current from the amplifier's output that causes a variable voltage drop through the associated resistor as the voltage on the amplifier's associated input connection varies, so that even if a voltage received at an input connections ranges outside the power supply voltage range, the voltage at the virtual ground input into the associated input amplifier will remain substantially constant, and, thus, within the power supply voltage range.

52. (original) A method as in Claim 51:

wherein said receiver circuitry uses said input amplifier feedback currents to generate an amplified input signal which varies as a function of the differential voltage across the transformer to which the input connections are connected; and

the transceiver controls the amplitude of said output signal in response to the difference between said amplified input signal and a desired signal level.

53-55. (canceled)

56. (currently amended) A method of operating a transmitter for driving an output signal through a transformer having a center tapped winding, said method comprising: ~~as in Claim 55~~

using transmitter circuitry including one or more output transistors to drive an output signal;

using a pair of output connections to connect said output signal across the center tapped winding of said transformer;

electrically isolating each output connection of said pair from the transmitter circuitry during a different portion of the output signal;

using a pair of input connections connected across the center tapped winding to receive the differential voltage across said winding; and

using a comparison between said received differential voltage and a desired signal level to control the amplitude of said output signal;

wherein:

said transmitter is part of a transceiver for sending and receiving signals through the center tapped transformer; and

said method uses receiver circuitry connected to said pair of input connections to produce an amplified input signal which varies as a function of said received differential voltage.

57. (currently amended) A method of operating a transmitter for driving an output signal through a transformer having a center tapped winding, said method comprising: ~~as in Claim 55~~

using transmitter circuitry including one or more output transistors to drive an output signal;

using a pair of output connections to connect said output signal across the center tapped winding of said transformer;

electrically isolating each output connection of said pair from the transmitter circuitry during a different portion of the output signal;

using a pair of input connections connected across the center tapped winding to receive the differential voltage across said winding; and

using a comparison between said received differential voltage and a desired signal level to control the amplitude of said output signal;

wherein:

said one or more output transistors are FET transistors each having an output contact and a control gate with a parasitic capacitance;

a controlled current flow to and from the gate of each output transistor is used to charge and discharge that gate and its parasitic capacitance, so as to increase and decrease, respectively, the output signal supplied by the output contact of the output transistor, said current flow being controlled by causing the voltage level that drives such current to compensate for changes in the voltage on the gate so as to make the rate at which such current flows substantially constant ~~more even~~ during said charging and discharging; and

said comparison between received differential voltage and a desired signal level is used to substantially stop said current to or from said control gate as a function of said comparison.

58. (currently amended) A method of operating a receiver for receiving a signal generated across a winding of a transformer, said method comprising:

using a pair of input connections to receive a differential voltage input from opposite sides of said transformer winding;

using a separate operational amplifier to receive a signal from each of said two input connections, wherein each of said operational amplifiers includes:

two inputs, a first of which is connected to a reference voltage; and

at least one output connected to the second of said amplifier's inputs to form an operational amplifier feedback loop which holds that second input at a virtual ground;

using a separate resistor associated with each of said two input connections, connected between said input connection and the virtual ground at the second input of the input connection's associated amplifier, to create a signal which varies as variable amounts of current pass from the operational amplifier feedback loop to the associated input connection, so as to help hold the amplifier's virtual ground at its associated reference voltage;

wherein said receiver is powered by a power supply providing electrical power having a certain power supply voltage range; and

whereby even if a voltage received at an input connection ranges outside the power supply voltage range, the voltage at the virtual ground input into the associated input amplifier will remain substantially constant, and, thus, within the power supply voltage range.

59. (original) A method as in Claim 58 wherein:

said receiver is part of a transceiver for both sending and receiving signals generated across transformer winding;

said transformer winding is the center tapped winding of a center tapped transformer; and

said method further includes:

using transmitter circuitry having one or more output transistors to drive an output signal; and

using a pair of output connections to deliver the output signal across said center tapped winding;

electrically isolating each of said pair of output connections from such transmitter circuitry during different polarities of the output signal;

producing an output measurement signal as a function of the feedback currents in said two input amplifiers, which signal varies as a function of the differential voltage supplied between the input connections; and

using a comparison between said output measurement signal and a desired signal level to control the amplitude of said output signal.

60. (original) A method as in Claim 59 wherein:

the transceiver is powered by a power supply voltage range between ground and a power voltage;

said transmitter circuitry:

only drives said winding with voltages within said power supply voltage range;

only drives one half of said winding at a time; and

drives a different half of said winding in a different direction at different portions in said output signal; and

the side of said winding which is not driven in a given portion of the output signal has induced into it a voltage of a polarity opposite to that supplied by the output signal to the side of the winding which is being driven, causing the voltage sensed at the input connection connected to the un-driven side of the winding to be on the opposite side of ground from the power voltage.

61. (original) A method as in Claim 58 wherein:

the input amplifier connected to a first of the input connections produces a first feedback current which is a function of the voltage of the first input connection; and

the input amplifier connected to a second of the input connections produces a second feedback current which is a function of the first feedback current minus a feedback current generated by said input amplifier which is proportional to the voltage of the second input connection; and

said method further includes producing an amplified input signal as a function of the second feedback signal.

62. (original) A method as in Claim 58 wherein:

each input amplifier has two outputs, and uses circuitry to cause substantially equal current to flow in each of those outputs even if the loads on those two outputs differ;

one of those outputs is used to provide the feedback current necessary to maintain the virtual ground at the amplifier's second input; and

the other of those outputs produces an equal current which is used in the receiver for another purpose.

63. (canceled)

64. (currently amended) The method of Claim 65~~3~~ wherein said use of circuitry to cause substantially equal current to flow in each of said two outputs includes using similar circuitry to drive each such output, including similar transistors connected to similar control voltages.

65. (currently amended) A~~The~~ method of operating an operational amplifier comprising: ~~Claim 63~~

receiving voltages at two inputs;

generating a difference signal as function of the difference between said two voltages; and

using circuitry to cause substantially equal currents to flow in each of two outputs as a function of said difference signal even if the loads on those two outputs vary;

wherein said use of circuitry to cause substantially equal current to flow in each of said two outputs includes using a separate complementary pair of output transistors to drive each such output, and using a separate cascode transistor corresponding to each output transistor of each such pair to cause each such output transistor to be less affected by variations in the voltage of each such complementary pair's output.

66. (canceled)

67. (currently amended) A method of operating a transmitter for driving an output signal through a transformer comprising: ~~as in Claim 66~~

using transmitter circuitry including one or more output transistors to drive said output signal;

delivering said output signal through a pair of output connections to opposite sides of said transformer coil;

producing a measurement of current flow across one or more of said output transistors; and

substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein:

said transmitter is powered by a power supply having two voltage rails;

the transmitter circuitry uses at least two complimentary pairs of said power transistors to drive said output signal, each which complimentary pairs has two output transistors connected in series between said voltage rails with a node between them to which the pair's associated output connection is connected;

the transmitter circuitry drives said two complementary pairs, so that one pair can drive current in a first direction across said transformer during one part of an output signal cycle, and the other pair can drive current in an opposite direction across said transformer during another part of the output signal cycle;

producing said measurement for the current flow across each output transistor in each complementary pair; and

substantially turning off current flow in all of said output transistors in response to a measurement that current flow in any one of said output transistors exceeds a given level.

68. (currently amended) A method as in Claim 67~~6~~ wherein at least a part of said transmitter is constructed as a single monolithic circuit including:

said output transistors;

at least part of said circuitry for measuring; and

at least part said circuitry for substantially turning off are all on one semiconductor chip.

69. (currently amended) A method of operating a transmitter for driving an output signal through a transformer comprising:~~as in Claim 68 wherein said monolithic circuit further includes:~~

using transmitter circuitry including one or more output transistors to drive said output signal;

delivering said output signal through a pair of output connections to opposite sides of said transformer coil;

producing a measurement of current flow across one or more of said output transistors; and

substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein at least a part of said transmitter is constructed as a single monolithic circuit including:

said output transistors;

at least part of said circuitry for measuring;

at least part said circuitry for substantially turning off are all on one semiconductor chip;

external connections, which are used to provide transistor drive signals to one or more external power transistors which, in turn, drive an output signal across the transformer;

an external current overflow connection, which is connected to receives an indication of a current overflow in one or more of said external power transistors when such a current overflow occurs; and

circuitry which responds to such an indication of an external overflow by substantially turning off said transistor drive signals.

70. (currently amended) A method as in Claim 69~~6~~ wherein:

said transmitter is part of a transceiver;

said transceiver includes:

a pair of input connections, which receive an input signal from the transformer coil; and

receiver circuitry, which amplifies that input signal and producing an amplified input signal.

71. (currently amended) A method of operating a transmitter for driving an output signal through a transformer comprising: ~~as in Claim 66~~

using transmitter circuitry including one or more output transistors to drive said output signal;

delivering said output signal through a pair of output connections to opposite sides of said transformer coil;

producing a measurement of current flow across one or more of said output transistors; and

substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein:

said transmitter generates said output signal in response to a digital sequence of one or more successive output bits received from other circuitry;

using latching circuitry to keep the current turned off, once it has been turned off, until the next end of a sequence of successive output bits is received from said other circuitry; and

resetting the latching circuit after said next end of said sequence of successive output bits, so that a later sequence of successive output bits received from said other circuitry can cause said transmitter to generate another output signal.

72. (currently amended) A method of operating a transmitter for driving an output signal through a transformer comprising: ~~as in Claim 66~~

using transmitter circuitry including one or more output transistors to drive said output signal;

delivering said output signal through a pair of output connections to opposite sides of said transformer coil;

producing a measurement of current flow across one or more of said output transistors; and

substantially turning off current flow in said one or more output transistor for at least a given time period when said current measurement exceeds a given level;

wherein said measurement of current flow is produced as a function of a voltage drop across a current sensing resistor in series with the current flowing through one or more output transistors.